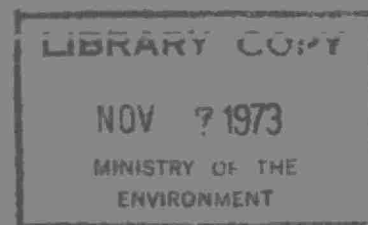


OPERATING SUMMARY

SIMCOE



LABORATORY & RESEARCH DIVISION

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2

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Ontario

Ministry of the
Environment

135 St. Clair Avenue West
Toronto 195, Ontario

We are pleased to present you with the 1972 operating summary for the water pollution control plant serving your community.

This summary contains data on the performance of the plant as well as relevant financial information. Of particular interest is the review of the year's activities in which significant items of these data are discussed in some detail by the operations engineer and his staff who, by their day-to-day involvement with the operation, are thoroughly familiar with the plant.

We appreciate your continuing interest in protecting the environment through the efficient operation of this wastewater treatment facility.

D.S. Caverly,
Assistant Deputy Minister.

D.A. McTavish, P. Eng.,
Director,
Project Operations Branch.

MINISTRY OF THE ENVIRONMENT

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DEPUTY MINISTER
E. Biggs

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OPERATIONS ENGINEER
J. Nurmberg

135 St. Clair Avenue West
Toronto 195

SIMCOE
WATER POLLUTION CONTROL PLANT

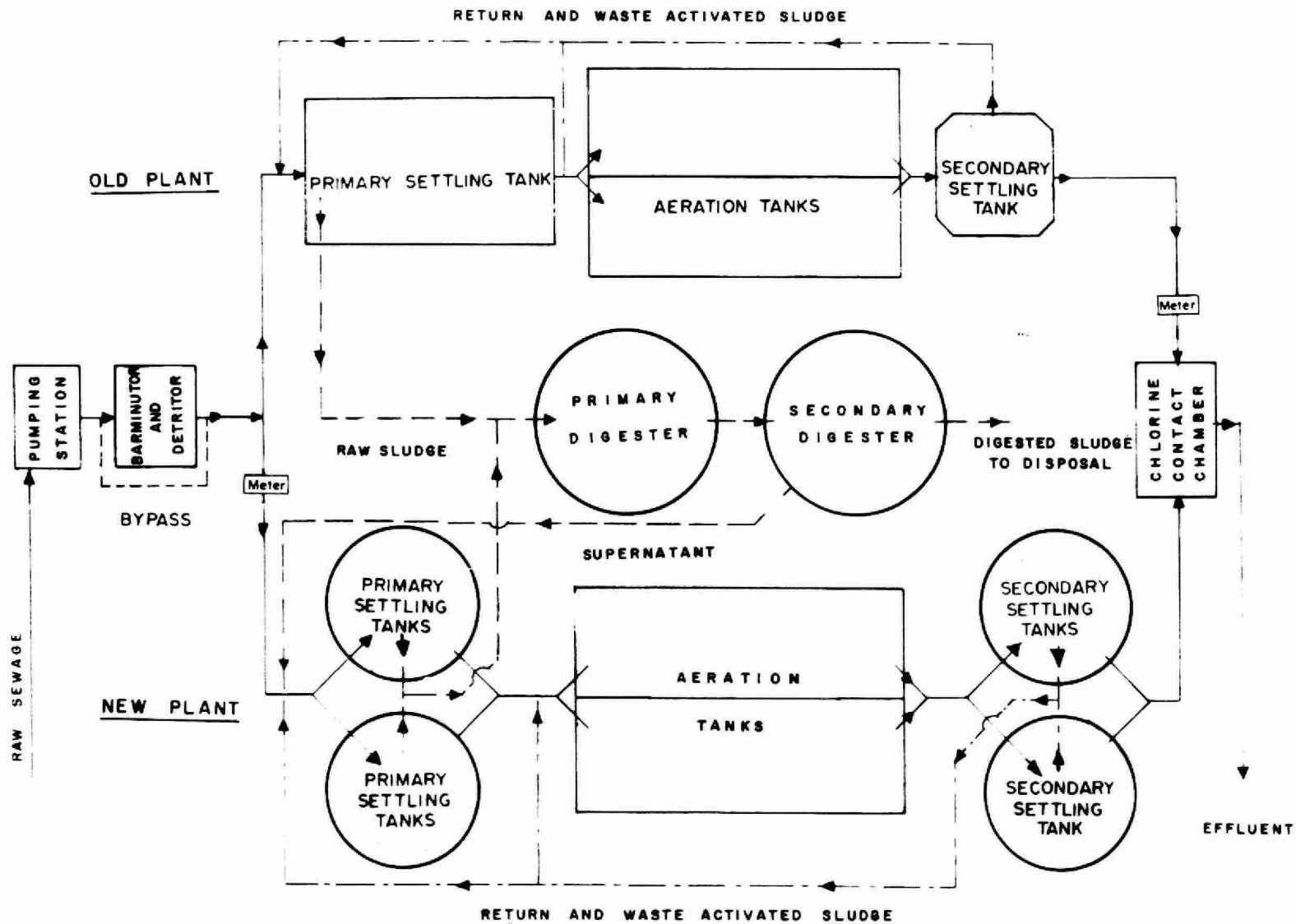
operated for
THE TOWN OF SIMCOE
by the
MINISTRY OF THE ENVIRONMENT

1972 ANNUAL OPERATING SUMMARY

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SIMCOE WATER POLLUTION CONTROL PLANT



DESIGN DATA

PROJECT NO. 2-0120-62

TREATMENT Activated Sludge

DESIGN FLOW 2.0 mgd

DESIGN POPULATION 15,400

BOD - Raw Sewage 220 mg/l
- Removal 90%

SS - Raw Sewage 230 mg/l
- Removal 90%

COMMON

RAW SEWAGE PUMPS

a) Type: Fairbanks-Morse
Size: One 1200 gpm @ 35' tdh

b) Type: Smart-Turner
Size: One 500 gpm @ 35' tdh

c) Type: Worthington
Size: Two 2000 gpm @ 50' tdh

PRETREATMENT (Common)

Grit Removal

Type: Dorr Detritor
Size: One 14' x 14' x 1½' (1,850 gal)
Retention: 1.33 min

Comminution

Type: Barminutor
Size: Model "C" (24")

PLANT #1 (0.6 mgd)

PRIMARY TREATMENT

Primary Sedimentation

Type: Hardinge
Size: One 50' x 20' x 8' (50,000 gal)
Retention: 4.31 hr
Loading: Surface, 600 gal/ft²/day
Weir, 30,000 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air, Four pass
Size: 8 - 12' x 50' x 8' (240,000 gal)
Retention: 9.6 hr

Diffusers

Type: Holes in pipe & spargers

Air Supply

Type: Roots-Connersville
Size: Two 1200 scfm

Secondary Sedimentation

Type: Dorr
Size: One 46' (hex) x 9½' swd (98,600 gal)
Retention: 3.16 @ design flow with 25%
return sludge
Loading: Surface, 360 gal/ft²/day
Weir, 4150 gal/ft/day

CHLORINATION

Type: W & T
Size: One 400 lb/day

Chlorine Contact Chamber

Size: One 18' x 14¼' x 6' (6,800 gal)
Retention: 16.4 min

PLANT #2 (1.4 mgd)

PRIMARY TREATMENT

Primary Sedimentation

Type: Dorr
Size: Two 45' dia x 10' swd (198,000 gal)
Retention: 3.4 hr
Loading: Surface, 440 gal/ft²/day
Weir, 5570 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 98' x 25' x 12½' (369,150 gal)
Retention: 6.3 hr

Diffusers

Type: Inka

Air Supply

Type: Dorr
Size: Two 5508 scfm

Secondary Sedimentation

Type: Dorr
Size: Two 45' dia x 10' swd (198,000 gal)
Retention: 3.4 hr
Loading: Surface, 440 gal/ft²/day
Weir, 5570 gal/ft/day

CHLORINATION

Chlorine Contact Chamber

Size: 15' x 20.6' x 8.2' (15,700 gal)
Retention: 16 min

OUTFALL (Common)

- to Lynn River

SLUDGE HANDLING (Common)

Digestion System - two-stage

Primary --

Type: PFT; gas mixed (Pearth floating cover)

Size: One 50' dia x 20' swd (43,250 cu ft or 270,000 gal)

Loading: 2.86 lb/cu ft/mo

Secondary --

Type: PFT

Size: One 50' dia x 20' swd (43,250 cu ft or 270,000 gal)

Total Loading: 1.43 lb/cu ft/mo

'72 Review

GENERAL

This project is composed essentially of two separate activated sludge treatment plants which share common raw sewage pumping, influent works, digestion and chlorination facilities. One plant of 0.6 mgd capacity was put into operation in 1956, and the second plant of 1.4 mgd capacity, was started up in August 1964. The aeration section of the newer plant is equipped with an Inka diffusion system.

Procedures to expand the plant continued throughout the year.

EXPENDITURES

The total operating cost for the year was \$85,066.24 or \$120.87 per million gallons of sewage treated. The unit cost of removing one pound of BOD was 4.5 cents.

PLANT FLOWS AND CHLORINATION

The total raw sewage flow treated at the plant was 695.7 million gallons, an increase of 95.6 million gallons from 1971. This represented an average daily flow of 1.9 million gallons or 95 percent of the plant's design capacity of 2.0 mgd.

An average chlorine dosage of 3.8 mg/l was required to maintain an average chlorine residual in the final effluent of 0.5 mg/l prior to discharge to the Lynn River.

AERATION

The average MLSS concentration of 4480 mg/l and F/M ratio of 0.15 for the old plant are within the limits of good aeration operation. Similarly for the new plant the average MLSS concentration of 3490 mg/l and F/M ratio of 0.26 are also within the limits of good aeration operation.

SLUDGE DIGESTION AND CENTRIFUGATION

A total of 3.07 million gallons of raw sludge was pumped to the digester. A total of 35.2 thousand gallons of waste activated sludge and 191.5 gallons of digested sludge was centrifuged resulting in an average cake T.S. concentration of 11.3 and 13.2 percent respectively.

PLANT EFFICIENCY

The average BOD and suspended solids concentration in the influent were 275 and 188 mg/l respectively. The effluent BOD and suspended solids concentrations of 8 mg/l for both were comparable to the Ministry of the Environment's objectives of 15 mg/l for each. Removal efficiencies for BOD and suspended solids were 97 and 95 percent respectively.

CONCLUSIONS

Under the supervision of head office personnel, the staff at the Simcoe WPCP operated a clean, attractive and efficient plant for the Town of Simcoe.

The installation of the centrifuge has proven to be a real asset to the operation of the Simcoe Water Pollution Control Plant.

PROJECT COSTS

NET CAPITAL COST	\$694, 205. 44
DEDUCT - Portion financed by CMHC (Final)	(409, 699. 75)
MUNICIPAL ADVANCES	<u>(37, 795. 29)</u>
Long Term Debt to MOE	<u>\$246, 710. 40</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1972	\$ <u>59, 159. 71</u>
Net Operating	\$ 84, 066. 26
Debt Retirement	2, 459. 00
Reserve	3, 913. 86
Interest Charged	<u>13, 835. 27</u>
TOTAL	<u>\$104, 274. 39</u>

RESERVE ACCOUNT

Balance @ January 1, 1972	\$ 13, 972. 57
Deposited by Municipality	3, 913. 86
Interest Earned	<u>809. 59</u>
	\$ 18, 696. 02
Less Expenditures	<u>8, 000. 00</u>
Balance @ December 31, 1972	\$ <u>10, 696. 02</u>

OPERATING COSTS

PAYROLL	48 %
FUEL	2 %
POWER	20 %
CHEMICALS	11 %
GENERAL SUPPLIES	3 %
EQUIPMENT	8 %
REPAIRS & MAINTENANCE	4 %
SUNDRY	2 %
WATER	1 %
TRAVEL	1 %

1972 COSTS

TOTAL ANNUAL COST

NET OPERATING	81 %
DEBT RETIREMENT	2 %
RESERVE	4 %
INTEREST	13 %

YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	TREATMENT COSTS	
			\$ per million gal	¢ per lb BOD
1968	654.82	46,216.84	70.58	3 cents
1969	627.50	50,722.79	80.83	3 cents
1970	692.1	62,747.30	90.70	3 cents
1971	660.1	93,586.01	141.80	6 cents
1972	695.7	84,066.26	121.00	5 cents

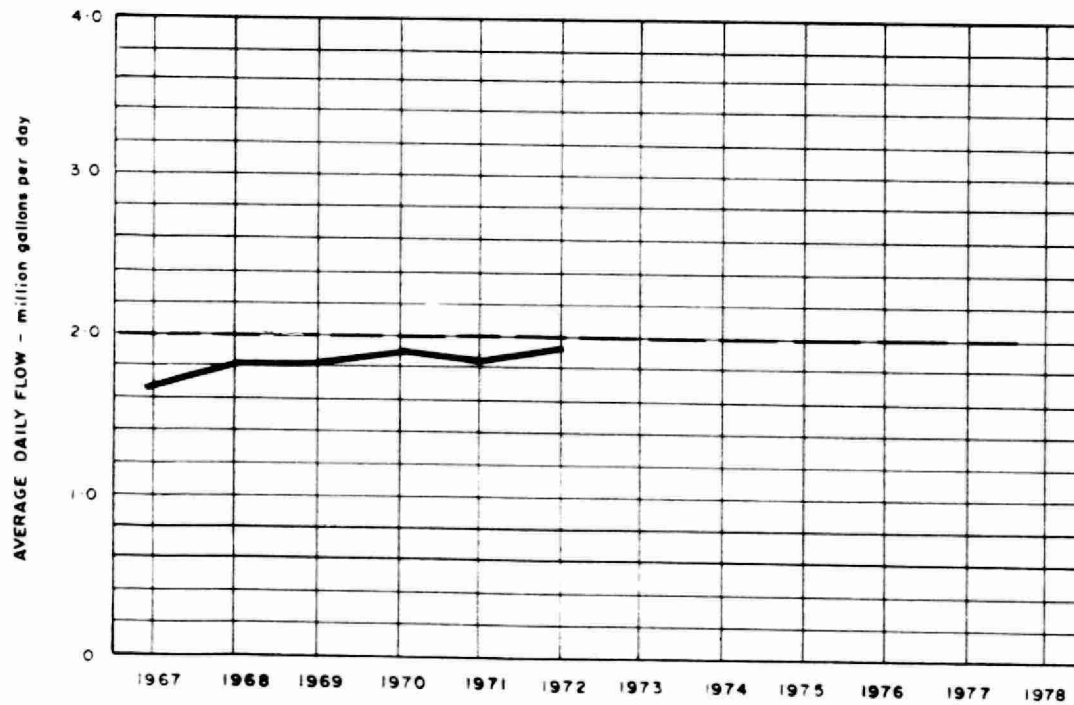
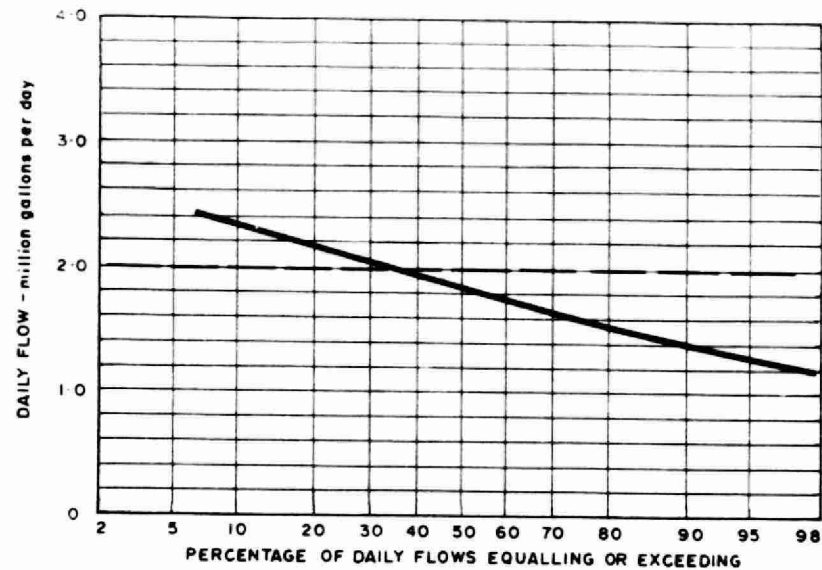
MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	REGULAR PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY*	WATER	TRAVEL
JAN	2846.78	2627.40	47.48					40.05	61.98	61.98		
FEB	6428.48	3206.22			1671.42	426.38	213.81	548.92	114.29	114.29	58.25	48.30
MAR	5556.85	2770.39			1339.22	107.01	157.02	749.87	90.51	90.51	63.00	105.70
APR	6733.61	2981.47	59.12	209.68	1814.32	852.76	349.28	262.62	31.91	31.91	63.00	45.60
MAY	6492.78	2894.18		332.33	1364.22		235.89	661.12	619.89	619.89	63.00	311.45
JUNE	7148.66	4070.46	393.98	4.00	1674.22		230.11	203.07	339.66	339.66	63.00	84.85
JULY	2885.65	64.75		142.38	1296.32	695.86	208.60	61.73	155.60	155.60	63.00	79.15
AUG	7881.72	2701.43	464.25		1849.58	265.50	132.50	1896.28	461.45	461.45	63.00	49.80
SEPT	4920.72	2919.49	434.29	24.57	1110.86		80.40		231.28	231.28	63.00	28.80
OCT	6796.10	3127.32	408.37	16.38	1606.07	1288.73	72.73	108.22	111.04	111.04	63.00	14.85
NOV	5775.41	390.43		284.27	1379.45	2525.13	60.07	70.00	156.39	156.39	63.00	27.90
DEC	20599.50	10114.66	677.85	765.58	1770.76	3202.34	407.75	2314.78	1084.01	1084.01	63.00	116.40
TOTAL	84066.26	37868.20	2485.34	1779.19	16876.54	9181.71	2148.16	6916.66	3458.01	3458.01	688.25	912.80

Brackets indicate credit.

* Sundry includes sludge haulage costs of

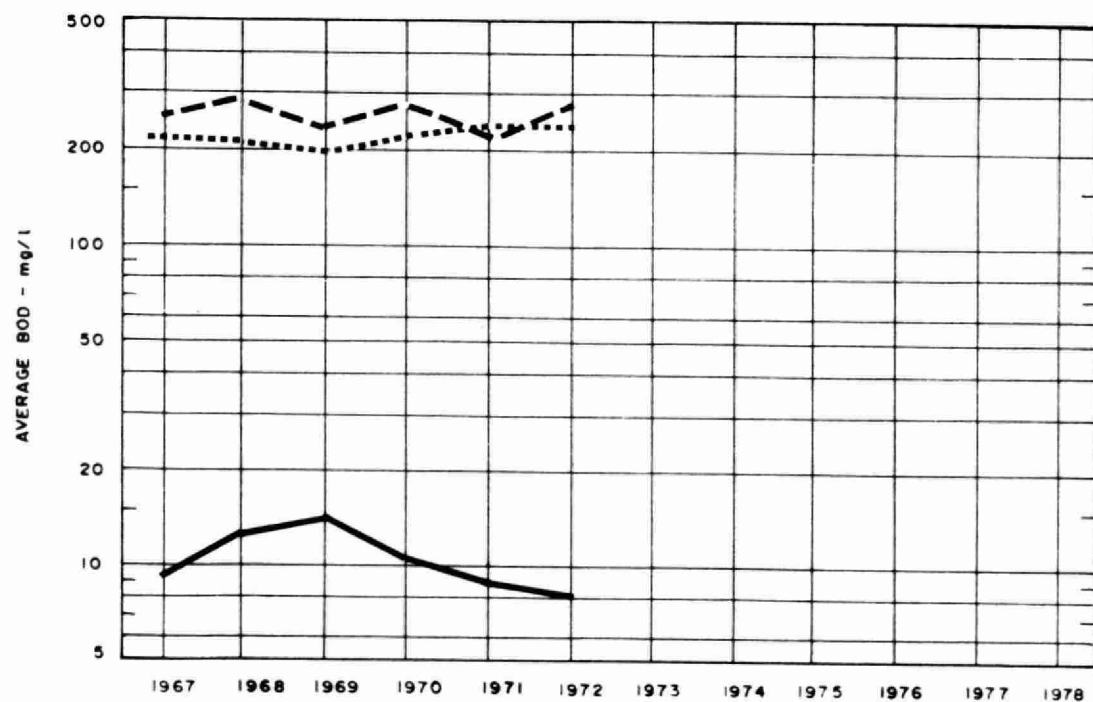
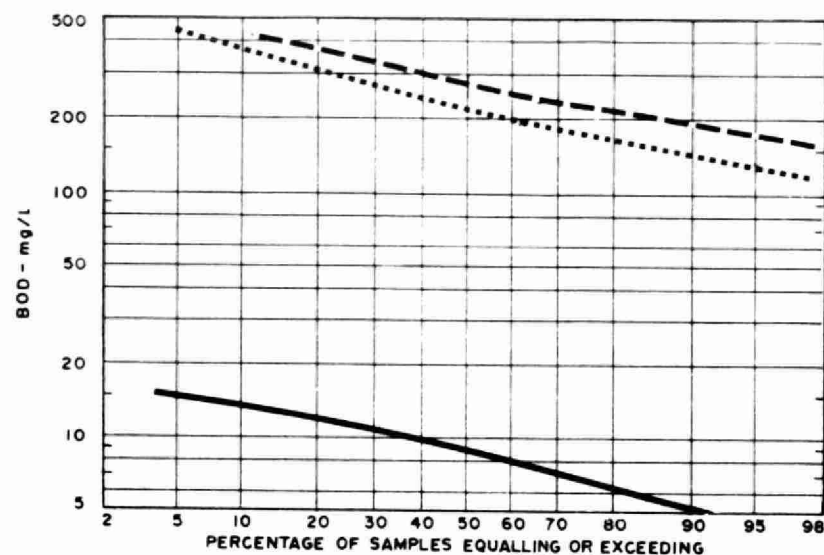
PROCESS DATA FLOWS



PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10 ³ pounds			%	10 ³ pounds		
JAN	56.9	1.8	2.3										
FEB	56.8	2.0	2.5	180	14	92	90	210	15	93	110	8.0	5.7
MAR	69.9	2.2	4.5	230	6	97	160	218	6	97	150	6.0	2.5
APR	68.5	2.3	2.9	223	6	97	150	147	8	95	95	6.6	3.9
MAY	67.5	2.2	2.5										
JUNE	63.5	2.1	2.7	320	10	97	200	160	20	88	89	7.4	3.5
JULY	58.9	1.9	2.3	280	10	96	160	110	10	91	59	7.6	6.2
AUG	53.1	1.7	2.1	270	8	97	140	180	10	94	90	9.3	4.3
SEPT	51.1	1.7	1.9	360	10	97	180	205	5	98	100	8.3	2.1
OCT	45.8	1.5	1.8	320	9	97	140	165	5	97	73	7.7	3.3
NOV	49.3	1.6	1.9	420	11	97	200	300	8	97	140	8.5	1.7
DEC	54.4	1.8	2.4	260	8	97	140	190	10	95	96	6.4	0.6
TOTAL	695.7	-	-	-	-	-		-	-	-		-	-
AVG.		1.9	MAXIMUM 4.5	275	8	97	156	188	8	96	100	7.4	3.2
No. of Samples	-	-	-	18	19	-	-	17	19	-	-	18	19

BIOCHEMICAL OXYGEN DEMAND

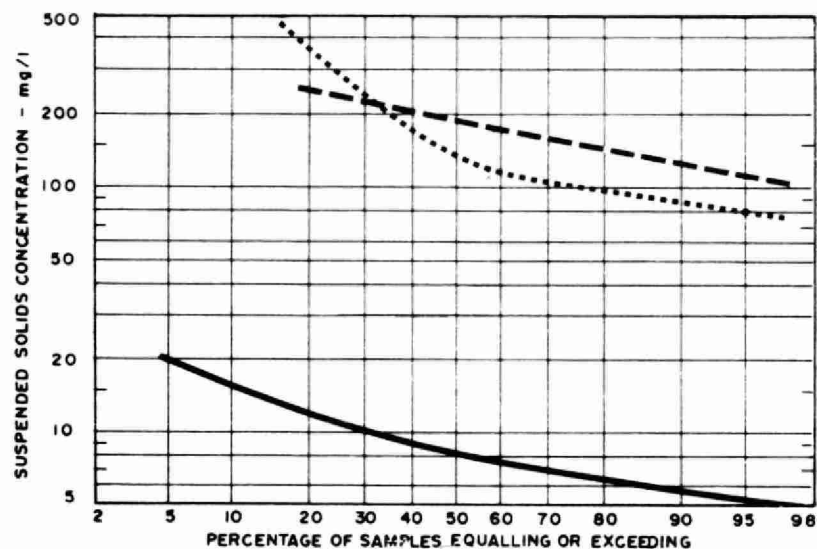


PLANT INFLUENT - - - - -

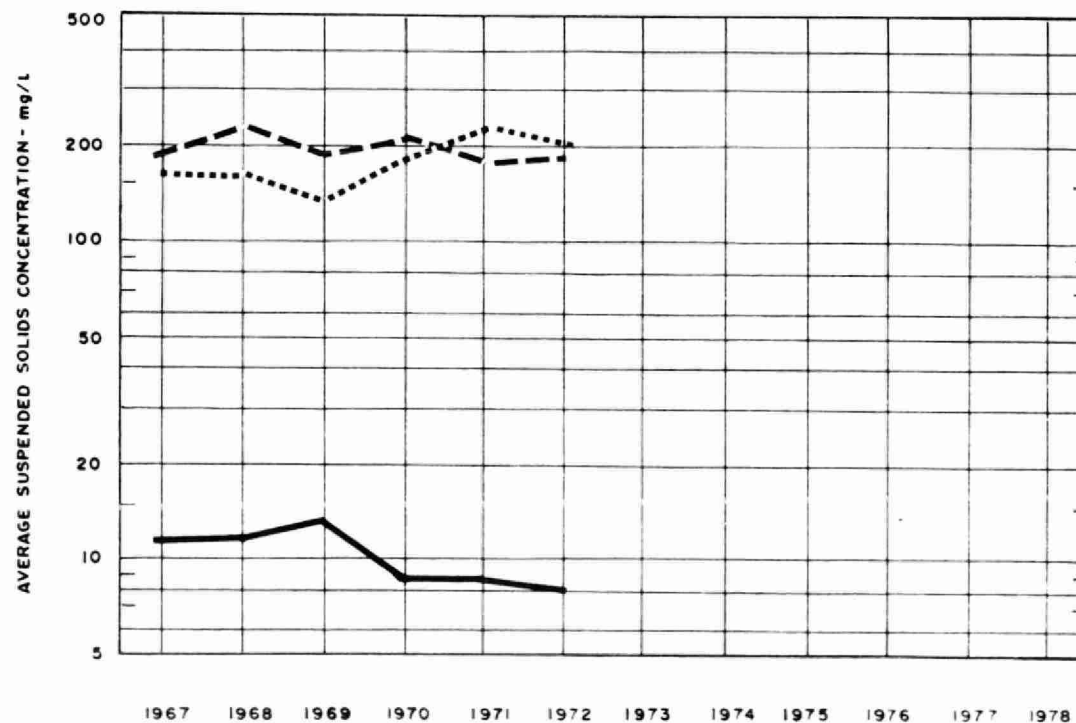
PRIMARY EFFLUENT

PLANT EFFLUENT —————

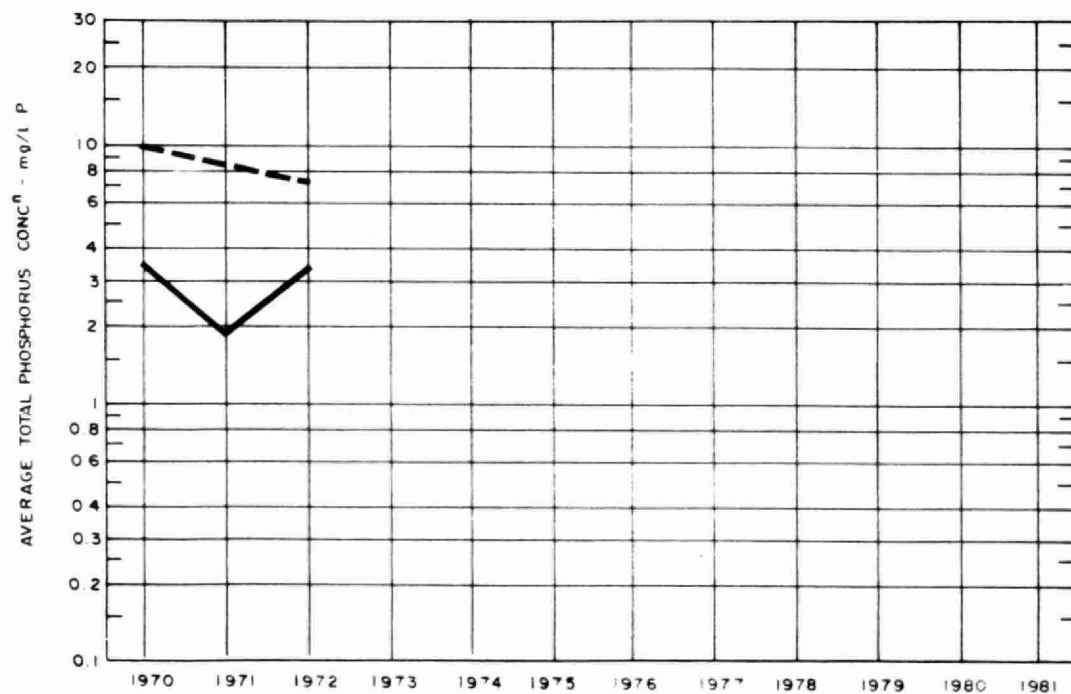
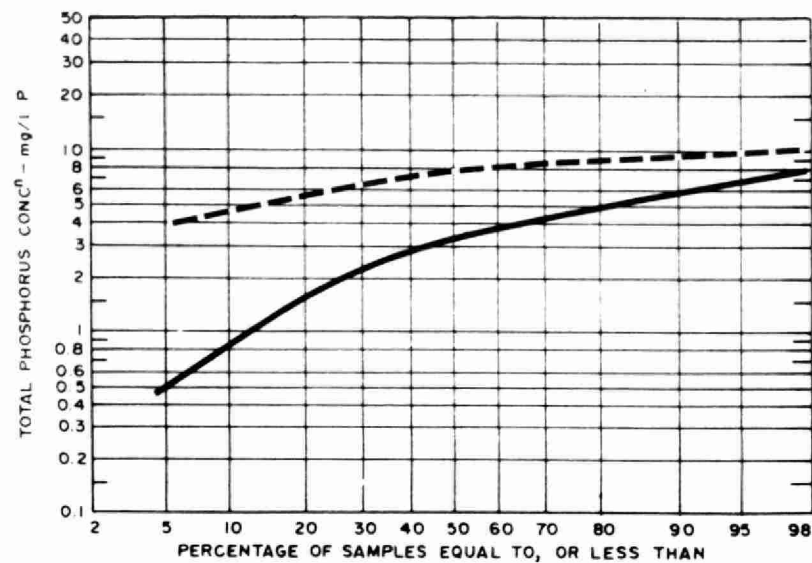
SUSPENDED SOLIDS



PLANT INFLUENT 
 PRIMARY EFFLUENT 
 PLANT EFFLUENT 



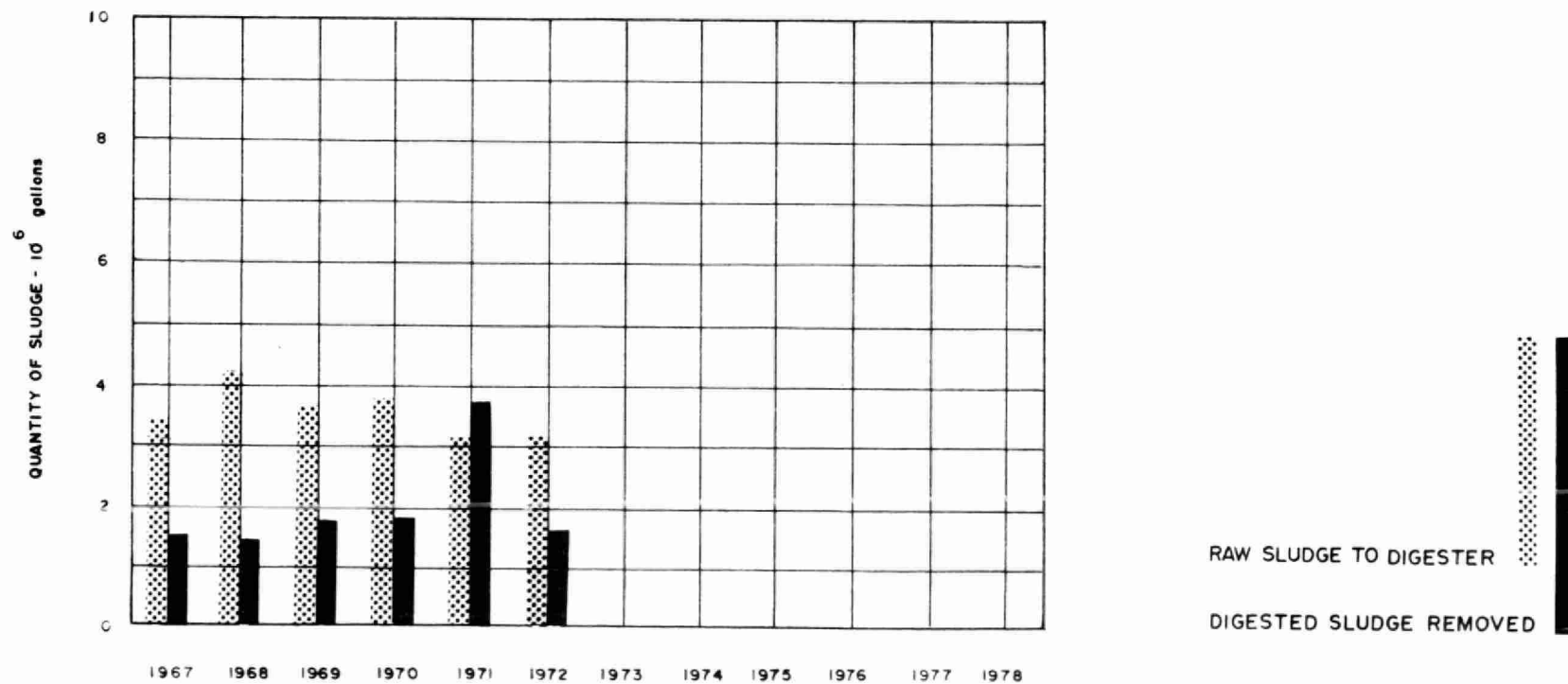
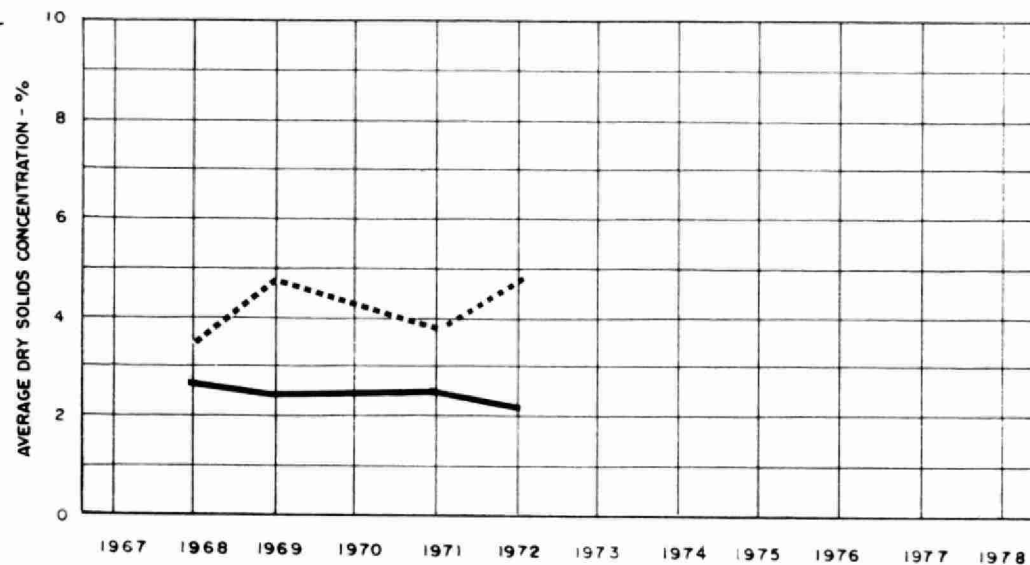
PHOSPHORUS



PLANT INFLUENT - - - - -
 PLANT EFFLUENT —————

DIGESTION

RAW SLUDGE
DIGESTED SLUDGE ———



TREATMENT DATA

MONTH	GRIT QUANTITY REMOVED cubic feet	CHLORINATION		SLUDGE DIGESTION and DISPOSAL							
		CHLORINE USED 10 ³ pounds	AVERAGE DOSAGE mg/l	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT	SLUDGE HAULED cubic yards
				QUANTITY 10 ³ gallons	TOTAL SOLIDS %	VOLATILE SOLIDS %	QUANTITY REMOVED 10 ³ gallons	TOTAL SOLIDS %	VOLATILE SOLIDS %	TOTAL SOLIDS %	
JAN	34	2.2	3.9	360			200				
FEB	31	2.1	3.6	320			190				
MAR	28	2.3	3.2	330			160				
APR	22	2.1	3.1	320			150				
MAY	37	2.1	3.2	300			150				
JUNE	31	2.0	3.2	300			180	2.1			92
JULY	19	1.7*	3.8	310			100				73
AUG	26	2.0	3.8	310			80				
SEPT	38	2.0	3.	120			130				31
OCT	29	2.1**	4.8	140	4.1		50				
NOV	35	2.3	4.6	120	4.4	6.7				.20	
DEC	31	2.4	4.3	140	5.9	60	120			.02	
TOTAL	361	25.3	—	3070	—	—	1510	—	—	—	196
AVG.	.5 cubic feet/mil gal	2.1	3.8	260	4.8	64	126	2.1		.11	

* Chlorination for 23 days

** Chlorination for 30 days

TREATMENT DATA

MONTH	NO.1 PLANT (old plant)								NO. 2 PLANT (new plant)							
	AVG DAILY FLOW mil gal	PRIM EFF		SEC EFF		AERATION			AVG DAILY FLOW mil gal	PRIM EFF		SEC EFF		AERATION		
		BOD mg/l	S S mg/l	BOD mg/l	S S mg/l	MLSS CONC mg/l	F/M day ⁻¹	AIR 1000ft ² lb BOD		BOD mg/l	S S mg/l	BOD mg/l	S S mg/l	MLSS CONC mg/l	F/M day ⁻¹	AIR 1000ft ² lb BOD
JAN	.68								1.16							
FEB	.72								1.24	220	150	14	15	4800	.15	5.6
MAR	.73	200	110	3	5	4350	.14	2.4	1.53	233	337	7	7	3270	.29	3.6
APR	.81	150	120	7	8	2850	.18	3.0	1.47	180	170	5	10	2900	.24	5.6
MAY	.87								1.31							
JUNE	.77								1.34	380	500	10	20	4250	.32	2.9
JULY	.68	260	90	10	10	4100	.18	2.0	1.22							
AUG	.63	320	295	8	10	5100	.16	1.8	1.09							
SEPT	.62	240	110	9	5	5850	.11	2.4	1.09	260	320	10	5	3950	.19	5.2
OCT	.45					5800			1.03	325	105	9	5	4400	.20	4.4
NOV	.57	120	70	7	10			2.7	1.07	280	140	15	5	1850	.42	4.6
DEC	.56	150	130	8	10	3280	.11	2.2	1.20					2580		
TOTAL																
AVG	.67	212	149	7	8	4480	.15	2.4	1.23	267	250	9	9	3490	.26	4.6

CENTRIFUGE OPERATION

MONTH	CENTRIFUGE OPERATION									
	WASTE ACTIVATED SLUDGE TREATED			POLYMER S U S E D				CENTRATE SUSPENDE D SOLIDS ppm	C A K E	
	TOTAL SOLIDS percent	VOLUME 10 ³ gallons	TOTAL SOLIDS 10 ³ pounds	4 4 4 K		7 2 5			TOTAL SOLIDS percent	HAULED cubic yards
				pounds	DOSAGE ppm	pounds	DOSAGE ppm			
JAN										
FEB										
MAR										
APR										
MAY	1.4	4.8	0.7	8.4	12500	3.5	5208	315	11.0	3.6
JUNE	1.4	48.7	8.2	28.5	3574	8.8	1134	682	11.2	10.3
JULY										
AUG	1.5	67.0	8.6	59.2	5983	14.1	1343	348	11.3	51.5
SEPT	1.3	41.6	5.4	37.1	6740	7.2	1436	313	12.1	26.2
OCT										
NOV	1.0	104.0	9.9	60.0	5625	31.9	3253	292	11.3	49.8
DEC	1.4	79.1	11.1	78.2	7213	26.3	2461	210	11.0	54.9
TOTAL		355.2	43.9	271.4		91.8				196.3
AVG	1.3	59.2	7.3	45.2	6939	15.3	2473	360	11.3	32.7

CENTRIFUGE OPERATION

MONTH	CENTRIFUGE OPERATION									
	DIGESTED SLUDGE TREATED			POLYMERS		USED		CENTRATE	C A K E	
	TOTAL SOLIDS percent	VOLUME 10 ³ gallons	TOTAL SOLIDS 10 ³ pounds	4 4 4 K		7 2 5		SUSPENDED SOLIDS ppm	TOTAL SOLIDS percent	HAULED
				pounds	DOSAGE ppm	pounds	DOSAGE ppm			cubic yards
JAN										
FEB										
MAR										
APR										
MAY										
JUNE	1.7	8.0	1.4	*	*	*	*	915	10.4	7.8
JULY										
AUG										
SEPT	2.4	55.2	13.3	66.3	4938	10.5	795	260	13.5	58.9
OCT	2.1	59.4	12.5	20.8**	5092	6.2**	1774	138	13.6	18.9
NOV	2.1	68.9	14.5	48.5	2402	24.6	1761	365	15.4	41.8
DEC										
TOTAL		191.5	41.7	135.6		41.3				127.4
AVG.	2.1	47.9	10.4		4144		1443	420	13.2	31.9

* Tests conducted. Polymer quantities not available.

** Quantities for 3 days operation.

LABORATORY LIBRARY



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